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# **STUDENT RADIOGRAPHERS' PERSONALITY; CONSTANT OR INDIVIDUAL DIFFERENCES IN CHANGE? A TRANSACTIONAL ANALYSIS APPROACH**

*Dr. L. Booth, PhD*  
*Mr. J. Parr BSc (hons)*

University of Cumbria, Medical Imaging Sciences, Lancaster

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## **Abstract**

It is considered in diagnostic radiography that incompatible personalities of student radiographers can have a detrimental influence on interpersonal relationships, student retention and job satisfaction. For this reason some authors argue that personality should be a criteria that is measured prior to enrolment onto the radiography programme. However recent evidence argues that personality can change and is influenced by education, clinical and life experience, suggesting that personality assessment would be an inappropriate measure prior to student selection. This research aimed to determine whether there were different personality profiles of student radiographers across the educational tenure (3 years). To facilitate this aim a cross sectional descriptive study was undertaken, using the Transactional Analysis Subscales of the adjective check list as the data collection tool. The data was analysed using both descriptive and inferential statistics (Krusal Wallis). The results demonstrated a significant difference between the personality profiles of diagnostic radiographers across the educational tenure, suggesting that education, clinical and life experience do impact on student radiographer's personality.

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**Keywords:** Diagnostic radiography, personality, Transactional Analysis

## **Introduction**

Personality is known to influence personal relationships with others (Abedi et al 2012), therefore it is not unreasonable to assume that the personality traits of radiographers will influence their relationships with patients. It is also considered that personality may affect job satisfaction and student retention (Arnold 1997, Decann 1985, Bladacchino & Galea 2012). Given the costs associated with student attrition, success at degree level and

the importance of patient-radiographer relationships, Decann (1985) and later Arnold (1997) suggested that selection onto radiography degree programmes should be based, partly, on personality traits. This is not a novel concept and has been considered in both medicine (Meit & Borges & Early 2007) and the allied health professions (Bladacchino & Galea 2012). However these authors tend to argue for the trait theory of personality, which is in part heritable and remains reasonably constant throughout an individual's life (Eley & Eley & Young & Rogers-Clark 2010), without considering 'individual differences in change' (Ludtke & Roberts & Trautwein & Nagy 2011), e.g. socio-cultural learning which is also influential on an individual's personality (Ludtke et al 2011 and Eley et al 2010). Recent research tends to dispel the myth around personality traits being constant and instead argues that whilst personality remains constant for around a period of 5 years at any one time, with this time period increasing as the person gets older, personality does change, with this change being greatest during the transition from adolescence to young adulthood (Ludtke et al 2011). Roberts and Walton and Viechtbauer (2006) (cited in Ludtke et al 2011) in their longitudinal study demonstrated personality change to be at its greatest between 18-30 years old and this is perhaps one factor that explains why Arnold (1997) noted a difference between the personality traits of student radiographers and qualified staff.

Given that it is now considered that personality is not constant, this research hoped to illuminate whether the personality profiles of student radiographers were different across the educational tenure, as we like Baldacchino and Galea (2012) believe that "self-esteem, family, social and clinical/ educational environments" play an important part in personality change and development. If personality does indeed change this argues against the idea that personality should play a part in student radiographer selection and that the task of educators during studentship is to ensure that personality traits, however inappropriate to the job, are accepted, then modified in a positive way.

This research therefore aimed to determine the personality traits of student radiographers across their educational tenure (3 years). To facilitate this aim the research utilised a branch of Transactional Analysis (TA) to determine personality traits. Although most research that looks at personality tends to use the 'The Five-Factor Personality Model' (Costa & McCrae, 1992), often referred to as the 'Big Five', these models are descriptive in their analysis of personality i.e. they simply tell us what an individual's personality looks like, and not how it might influence interpersonal relationships. TA's structural and functional models however are expedient in both their description of personality composition and of how personality composition can militate the outcomes of social interactions (Johnsson 2011,

Booth & Manning, 2006, Stewart & Joines, 1987) and we felt it was important to draw conclusions on how the personality of student radiographers might influence their relationships with patients.

### *TA and personality*

According to TA, an individual's personality is comprised of distinct ego-states: Parent, Adult and Child (Berne 1996). The Parent ego-state is separated into the Critical-parent and the Nurturing-parent. The Critical-parent reflects pre-conceived thoughts, feelings and beliefs that are learned from parental figures and peers (Solomon, 2003) and the Nurturing-parent is protecting and guarding (Stewart & Joines 1987). The Child ego-state is separated into the Free-child and Adapted-child. The Free-child is active, creative and spontaneous and the Adapted-child is the part of the personality that develops from parental messages learned during childhood (Solomon 2003). The Adult ego-state is undivided and operates on the level of reason and rationality (Berne 1996).

An ego-state is neither good nor bad since the presentation of behaviours can have outcomes that are positive or negative, depending upon the context of interactions (Berne 1996, Stewart & Joines, 1987).

How personality influences these interactions, according to TA theory, is described using the concept of transactions, where a transaction is a communication stimulus that elicits a particular communication response (Booth 2007, Berne, 1996). Specifically, there are three types of transactions: parallel, crossed and ulterior, which are determined according to the ego-states and manifest during the communication process (Berne 1996):

- Parallel; occurs when an agent receives the expected response, and can proceed until an external stimulus disrupts the flow
- Crossed; occurs when an agent does not receive an expected response causing communication problems to arise
- Ulterior; occurs when the meaning of a stimulus is disguised, with the outcome determined at the psychological rather than social level

In general, transactions and therefore relationships defined by communication events follow a simple rule; providing transactions are complementary, communication may continue indefinitely and harmoniously, but if there is a crossed transaction then a break or change in communication will occur (Berne 1996).

The use of TA to identify personality traits depends upon the correct assessment of these ego-states. Booth (2007) discusses a number of early methods proposing to simplify the reliable identification of ego-states from the position of relatively inexperienced participants. Although the methods described require only a modest understanding of the deeper theoretical concepts behind Transactional Analysis (Dusay 1977, Thompson 1972), they

have been criticised for tending to favour an impressionistic and intuitive, rather than an objective discernment of the ego-states (Paley & Sapiro 2001).

A more reliable and valid measure of ego-state assessment that can be undertaken is known as the Adjective Check List (ACL) (Williams & Williams (1980)), see table 1.

**Table 1. - The Adjective Check List (ACL)**

<b>Critical</b>	<b>Nurturing</b>	<b>Adult</b>	<b>Free Child</b>	<b>Adapted</b>
<b>Autocratic</b>	Affectionate	Alert	Adventurous	Anxious
<b>Bossy</b>	Considerate	Capable	Affectionate	Apathetic
<b>Demanding</b>	Forgiving	Clear-thinking	Artistic	Argumentativ
<b>Dominant</b>	Generous	Efficient	Energetic	Arrogant
<b>Fault finding</b>	Gentle	Fair-minded	Enthusiastic	Awkward
<b>Forceful</b>	Helpful	Logical	Excitable	Complaining
<b>Intolerant</b>	Kind	Methodical	Humorous	Confused
<b>Nagging</b>	Praising	Organised	Imaginative	Defensive
<b>Opinionated</b>	Sympathetic	Precise	Natural	Dependent
<b>Prejudiced</b>	Tolerant	Rational	Pleasure-	Hurried
<b>Rigid</b>	Understanding	Realistic	Sexy	Inhibited
<b>Severe</b>	Unselfish	Reasonable	Spontaneous	Moody
<b>Stern</b>	Warm	Unemotional	Uninhibited	Nervous

(Williams & Williams, 1980)

Since the development of the ACL, the reliability and validity of the ACL instrument has been verified in studies by Emerson et al. (1994) and Paley & Shapiro (2001) through the use of alternative measuring techniques and more recently the ACL has been utilised in studies exploring communication interfaces within healthcare (Kececi & Tasocak 2009, Booth & Manning 2006, Chue & Slater 2004). Of interest to this research proposal; Kececi & Tasocak (2009) applied the ACL sub-set as part of their approach to collecting quantitative data pertaining to a self-assessment of student and staff ego-states in Turkish teaching hospitals. The application of TA and the ACL to this particular investigation is considered to be both purposeful and germane.

## **Method**

### *Questionnaire*

The implementation of the ACL as a reliable research instrument to collect self-administered ego-state assessments is described in Williams and Williams (1980) and Kececi and Tasocak (2009). Each construct is assigned a 5 point likert scale and respondents are asked to rate how closely they agree with each construct, an example of this is given below (see table 2).

**Table 2. - Example of the Likert-scale presentation of two ACL constructs taken from the nurturing parent ego-state and the critical parent ego-state**

<b>I tend to be warm</b>	1	2	3	4	5
<b>I tend to be stern</b>	1	2	3	4	5

*Sample*

This questionnaire was then given to all students currently studying for the BSc (hons) in diagnostic radiography. The sample size and response rate for each year group is demonstrated in table 3. We did not record age or gender for each student and as both age and gender have been shown to influence personality (Meit et al 2007), this is a recognised shortcoming of the present research.

**Table 3 - Sample sizes/response rates for each year group**

<b>Group</b>	<b>Population</b>	<b>Sample Size</b>	<b>Response (%)</b>
<b>Year 1</b>	<b>69</b>	59	85.51
<b>Year 2</b>	65	56	86.15
<b>Year 3</b>	58	56	96.55
<b>Total</b>	192	171	89.06

**Data Analysis**

*Measures of central tendency*

Knapp (1990) argues that using parametric statistics with ordinal scales are incompatible. However, in instances where the data set is reasonably small, then non-parametric measures may be a less efficient estimator of central tendency and a parametric approach should be considered (Bonett & Price 2002, Armitage & Berry & Matthews 1995, Knapp 1990). Likert-item questions can be linearized if they are a defensible approximation of interval data (Green & Salkind, 2008) and both mean (interval) and median (ordinal) measures of central tendency can be presented for comparison. The first stage of this analysis was to therefore change the data from ordinal to interval to allow parametric (mean) statistics to be performed. Kececi and Tasocak (2009) describe a method to transform ordinal data into interval data in order to create an ego-gram. An ego-gram graphically describes the extent to which a person presents in the different ego-states (Hollins 2011). It illustrates the constancy hypothesis proposed by Dusay (1977, cited in Stewart & Joines, 1987) that contends that the sum of ego-states aggregates personality and is always a constant; i.e. if one ego-state increases in intensity then another must decrease accordingly to balance the affect.

Personality type, as it is described using this approach, is a compound of associated ego-states, with a maximum possible score of 1. This representation is analogous to a percentage scale and enables a diagrammatic comparison of results by quantifying personality and central tendency based upon the mean strength of association with each ego-state (Akbag 2000, cited in Kececi & Tasocak, 2009).

#### *Measure of variance*

The second stage of analysis, involved the use of inferential statistics, which was used alongside the descriptive statistics, previously described, to determine the significance of the results. In this instance it is advisable to use the data in its ordinal format, necessitating the need for a non-parametric test (Bland 2009).

For more than two data groups, the rank analogue of one-way analysis of variance is the Kruskal-Wallis (K-W) non-parametric test (Bland 2009). The K-W test can be applied to three or more independent data groups and uses an extension of the Mann-Whitney U-test (Ramlaul 2010). It is suitable if marked sampling variances occur or when the data do not meet the requirements for parametric testing, i.e. non-normally distributed ordinal data (Green & Salkind 2008; Armitage et al 1995).

#### *Establishing statistical significance*

A non-linear relationship exists between the H value expressed by the K-W test and the scale of difference between year groups (Hole 2007). When  $H \geq \text{Chi-square}$  for a particular degree of freedom, found by indexing H with a table of critical Chi-Square values, a P-value that represents the level of significance of H can be found (Hole, 2007). Although any P-value can be arbitrarily assigned to indicate significance (Bowers 2002), table 3.8.4 shows the values most commonly cited in medical research.

**Table 4 - Interpretation of P-values for significance testing**

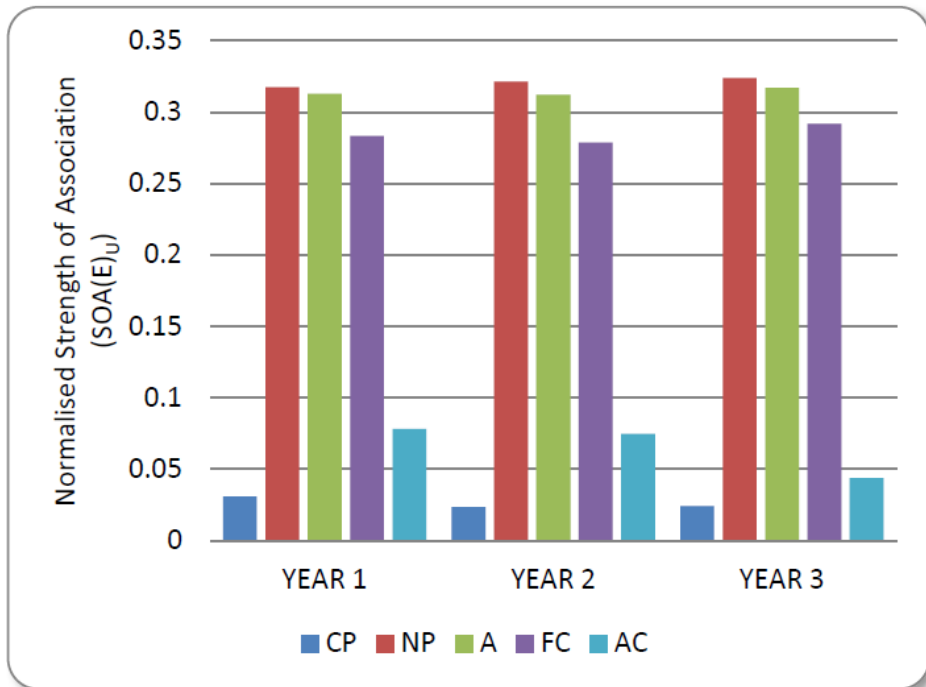
<b>P-Value Test</b>	<b>Interpretation</b>
<b><math>0.01 \geq \text{P-Value}</math></b>	Strong evidence to reject the null hypothesis
<b><math>0.01 &lt; \text{P-Value} \leq 0.05</math></b>	Moderate evidence to reject the null hypothesis
<b><math>0.05 &lt; \text{P-Value} \leq 0.10</math></b>	Weak evidence to reject the null hypothesis
<b><math>0.10 &lt; \text{P-Value}</math></b>	Little evidence to reject the null hypothesis

(Ramlaul, 2010)

However, the K-W test only tells us if year groups differ, not how they differ, and an overall judgement must be made based upon a correlation of the group medians (or means) and P-values (Hole 2007; Armitage et al 1995).

**Results**

**Figure 1** - Ego-grams comparing students’ self-assessed personality by year group according to normalised strength of association (SOA)



**Table 5** Trends in central tendency of student’s self-assessed ego-states by year group

Ego-state	Year 1	Trend	Year 2	Trend	Year 3	Net Trend
Median( CP )	0	≡	0	≡	0	No change in perception
Mean( CP )	0.345	>	0.274	≈	0.287	Decreasing perception of CP
Median( NP )	3	<	4	≡	4	Increasing perception of NP
Mean( NP )	3.430	≈	3.551	≈	3.708	No change in perception
Median( A )	3	<	3.5	<	4	Increasing perception of A
Mean( A )	3.381	≈	3.340	<	3.630	Increasing perception of A
Median( FC )	3	≡	3	≡	3	No change in perception
Mean( FC )	3.066	≈	3.080	<	3.343	Increasing perception of FC
Median( AC )	0	≡	0	≡	0	No change in perception
Mean( AC )	0.781	≈	0.745	>	0.512	Decreasing perception of AC

Trends in central tendency shown in Table 5 suggest that students’ perceptions of themselves changes with educational experience. Students show increasing perception of the A, NP and FC ego-states and decreasing perception of the CP and AC ego-states.

Table 6 records the results of the K-W analysis (H) and the P-values derived from the Chi-square table. The findings posit moderate evidence to suggest the increasing perception of the A and FC ego-states is significant; moderate evidence to suggest the decreasing perception of the AC ego-state



is significant; and, although significant, only weak evidence to suggest the decreasing perception of *CP* and the increasing perception of *NP* ego-states is significant.

**Table 6 - Results of Kruskal-Wallis testing on students' self-assessed ego-states**

	<b>H</b>	<b>P-value</b>	<b>Significance</b>
<b>CP</b>	5.261	0.072	Weak evidence
<b>NP</b>	5.347	0.069	Weak evidence
<b>A</b>	6.247	0.044	Moderate evidence
<b>FC</b>	6.437	0.040	Moderate evidence
<b>AC</b>	6.540	0.038	Moderate evidence

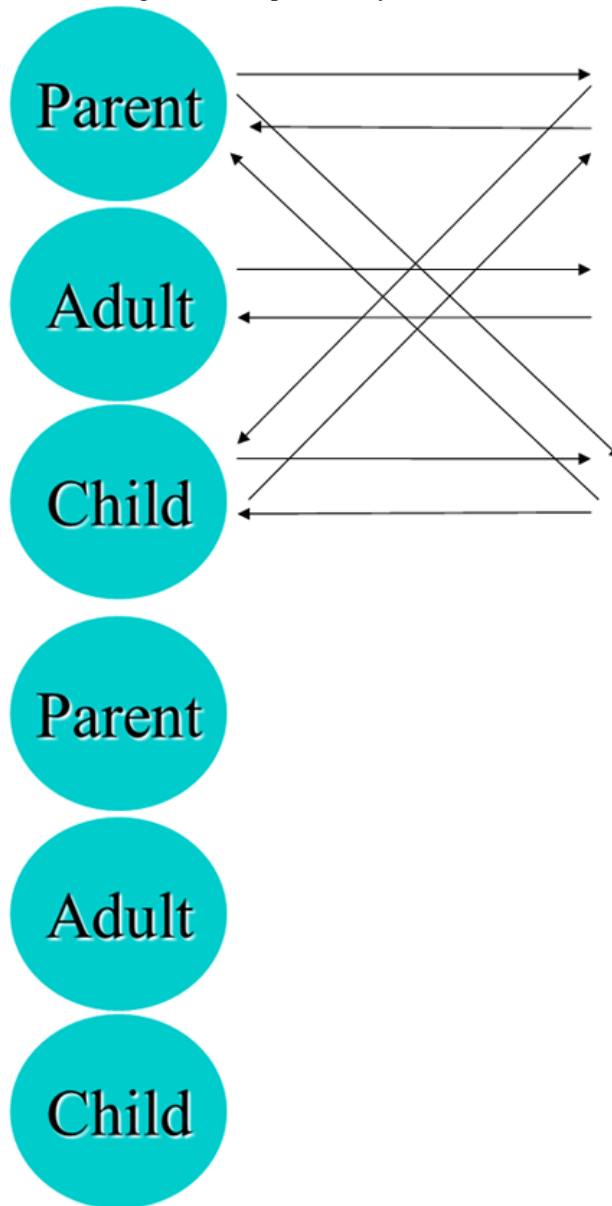
## Discussion

The aim of this study was to assess student personality types using a cross section of Year 1, Year 2 and Year 3 student radiographers. Descriptive statistics in the form of the median and mean were used to determine the central tendency of each year group, and inferential statistics in the form of the Kruskal-Wallis test was used to determine the significance of any changes in central tendency across the three year groups. There are some criticisms of the method; firstly that the study was cross sectional rather than longitudinal so one has to be careful when discussing personality change across the educational tenure; and secondly the sample did not consider gender or life experience, which may have influenced the results in some way. Nonetheless we provide some evidence here that the personality traits of student radiographers might not be consistent as suggested by Decann (1985) and Arnold (1997) and that assessing the personality traits of students prior to their selection onto radiography courses may not be a reliable and valid approach to ensuring retention on these programmes, job satisfaction and good patient care.

The use of TA as a method to analyse the personality of students as opposed to established methods such as the 'big five' makes it difficult to compare our findings here to other work that has looked at personality assessment in health care staff, nonetheless we feel the use of TA is a valid, reliable method that allows us to make inferences around communication styles and radiographer relationships with patients.

Overall the results demonstrate a negative correlation with Critical Parent (CP) and Adapted Child (AC) traits across the three years; and a positive correlation with FC, A and NP. One of the reasons for using a TA approach was to draw conclusions as to how these personality traits might influence communication and relationships with others. If we consider the complementary transactions discussed earlier and the work of Booth and Manning (2006) we can see that certain traits encourage traits in another person, see figure 2.

Figure 2. Complementary transactions



Booth and Manning (2006)

The preference for Free Child (FC) and Adult (A) traits suggest, according to Booth and Manning (2006), that these will encourage FC and A behaviours in those that we are communicating with (see figure 2). It has been recognised by Booth (2005) that patients do enjoy being part of FC-FC relationships, as the playful and joking behaviours make them feel like they are part of the team. Similarly A-A relationships are also encouraged

between practitioners and patients (Parissopoulos & Kotzabassaki 2004) as these see patients as equal participants in their care, encourage adherence and allow the patient opportunity to ask questions.

These results however differ somewhat to similar studies that have looked at personality traits using TA in radiography. Booth and Manning (2005), in their study of qualified radiographers, found a preference for CP, A and Nurturing Parent (NP) personality traits, with AC and FC scoring low on the ACL. This difference in the identification of CP and FC traits between qualified and student radiographers can perhaps be explained by the fact that Booth used observations of behaviours to classify radiographer's personality traits, whereas this study utilised a self-report measure. Self-report measures can be problematic with individuals wishing to portray themselves in a positive light to the researcher (Lobiondo-Wood & Haber 2002). This difference might also be explained by the fact that in practice the pressures of working in the clinical environment encourages CP behaviour over FC behaviour, as CP is seen as a more efficient way of working (Booth 2008), which encourages further 'individual differences in change' (Ludtke et al 2011) which continue long after the student qualifies. The finding certainly suggests that a longitudinal study that follows students throughout their educational tenure and beyond, might give more insight into how and why personality changes in radiography. Certainly Ludtke et al (2011) in their longitudinal study of university students, found individual differences in change to occur 4 years after graduation, although this change was less marked than the previous 4 years.

In the present study it was also found that there is a decreasing preference for AC traits as the students move across their educational tenure, and 3<sup>rd</sup> year students scoring low in AC characteristics is similar to findings that have looked at the characteristics of qualified diagnostic radiographers (Booth 2005). The reasons for this decrease is perhaps unsurprising with 1<sup>st</sup> students lacking confidence in their abilities at the beginning of the course (congruent with the AC ego-state) but becoming more confident and assertive (congruent with A ego-state) as they gain experience and knowledge. Again Ludtke et al (2011) found increasing levels of openness and conscientiousness, particularly in students who chose vocational courses, as they moved through education and beyond.

As well as increasing Adult traits we found an increase in NP traits, which appear to be common in both students and qualified staff (Booth & Manning 2006). There is some controversy around the use of NP in health care, whereas on one hand NP is seen as a positive personality trait as it is nurturing, sympathetic and caring; all traits that are considered important in a caring profession (Hewison 1995), on the other the NP actually encourages AC behaviour in the patient (see figure 2). NP-AC relationships can be

illness maintaining (Emrich 1989) in that they encourage the patient to be dependent on the practitioner and do not see the patient as an active participant in their care (Parissopoulos & Kotzabassaki 2004). Nonetheless it may be that at students feel that they are expected to have such characteristics as it has been found in previous studies in radiography and nursing that these traits are considered to be positively correlated with being a 'good health care practitioner (Hewison 1995, Booth 2008).

### **Conclusion**

According to the literature A behaviours should be encouraged in our students and qualified staff as these promote A-A practitioner-patient interactions (Parissopoulos & Kotzabassaki 2004). For reasons explained earlier and the fact that A traits in students seem to increase across the three years, this seems to be a positive finding in the present research. Although a longitudinal study that also looks at gender and age would be needed to confirm this. Such a study would also set up ideas for future work on the factors that cause these personality modifications; strategies that can be used to facilitate these changes as well as tests of their efficacy.

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